1. INTRODUCTION

This report documents the process and results of the Indiana Department of Transportation (INDOT) Intermodal Management System (IMS) study. This project, initiated and managed by the Division of Planning at INDOT was conducted between June, 1995 and February, 1997.

1.1 Background

The Intermodal Surface Transportation Efficiency Act (ISTEA) passed by the U.S. Congress in 1991 and subsequent rulemakings marked a major shift in transportation planning, aimed at fostering improved and more market-based intermodal transportation and mode interconnectivity. Through a better understanding of and integration among the different transportation modes, it was expected that the transportation professionals around the country would be able to improve the efficiency in the movement of goods and persons, increase safety levels, and protect public transportation investments.

At the time it was passed, the ISTEA legislation mandated the development of six management systems to assist in this improvement process. While management systems are no longer mandatory, they are heavily encouraged by the Federal Government for all States. The Intermodal Management System (IMS) is the subject of this documentation. The other five systems are the Bridge, Congestion, Pavement, Safety, and Public Transit management systems.

In general, State Departments of Transportation (DOTs) have taken the lead in developing, and integrating, these management systems, though some Metropolitan Planning Agencies (MPOs) assumed the responsibility for developing regional Congestion Management Systems.

For a brief description of the other management systems and the status of these systems at INDOT please refer to the Management Systems Integration document in the appendix section of this report.

1.2 Goals

ISTEA advocated a shift from the traditional modal emphasis of transportation planning towards a multi-modal and intermodal focus. Indiana's IMS addresses intermodal facilities relevant to the State's person and goods movement and "links" connecting these facilities to the National Highway System (NHS). As such, it does not specifically address transportation corridors. However, other efforts under way at INDOT such as the Congestion Management System and the Major Corridor Study focus on corridor issues and improvement opportunities.

In discussions between INDOT and the consulting team, a blueprint for Indiana's IMS was developed during the project's initial phase. The following general "design" parameters were identified as cornerstones of the study:

- the study represented a "proof of concept" that aimed at developing concepts and tools in the most efficient manner, not a full-blown system development effort -- INDOT wanted to analyze the value-added from the overall process before embarking on a more detailed all-encompassing effort similar to the work done in California, Michigan or Ohio (at significantly higher costs)

- an advisory committee comprised of a representative sample of public and private transportation stakeholders would be established and included at every step of the IMS development process

- the process at its core would focus on improving the effectiveness and efficiency of Indiana's Intermodal Transportation system as it relates to connecting the major intermodal facilities to the major transportation corridors in the State.

- the network of statewide significance would build on the identification of NHS major intermodal facilities and their connecting links

- market-based performance measures would be developed to evaluate the efficiency and effectiveness of intermodal facilities and connections

- a Decision Support System (DSS) would be developed to assist in the analysis and provide INDOT with the base for an integrated multi-modal planning tool

- the study would conclude with action and strategy recommendations that address the highest ranking deficiencies and provide INDOT with related policy issues.

Aside from these guiding principles, the IMS is also adapted to INDOT's specific needs:

- it analyzes "big picture" transportation issues in Indiana

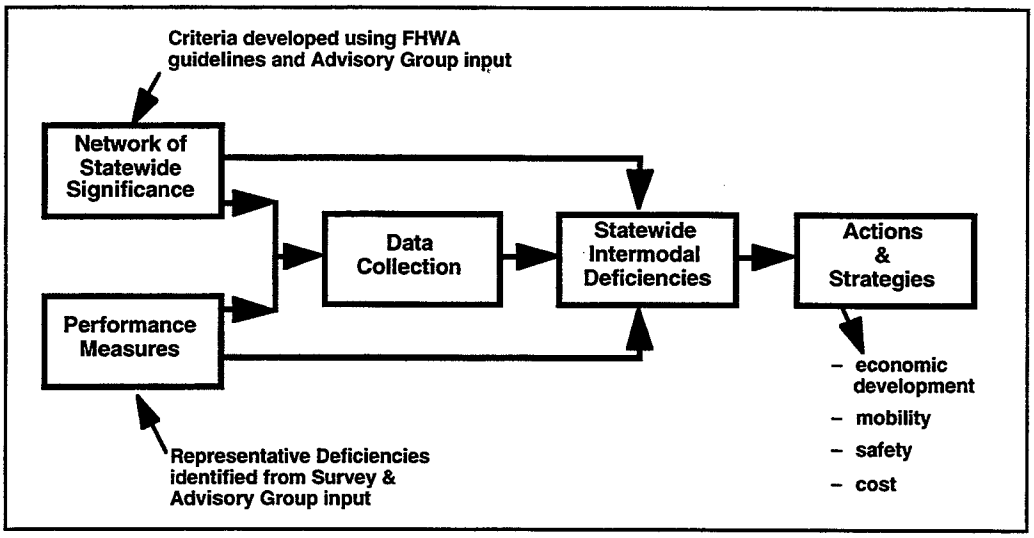
- it focuses on facilities of statewide significance and associated access links

- it addresses passenger and freight movement.

INDOT and its consulting team have maintained a very close relationship throughout the development process.

1.3 Development Process

The IMS development followed a logical step-by-step process as shown in the exhibit below. Two primary concerns were (a): the need to ensure that resources were used in the most efficient manner and (b): that the Advisory Committee feedback was solicited throughout.



For instance, note that data collection efforts did not fully commence until the network of statewide significance was defined and the performance measures used to identify deficiencies were developed. The significant elements of the overall development process are briefly discussed below.

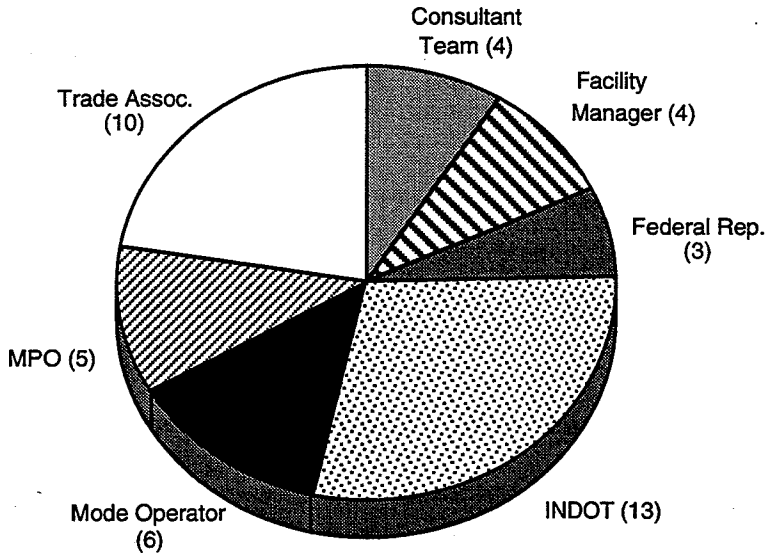
1.3.1 Advisory Committee

The IMS Advisory Committee was set up to represent a broad cross section of the Indiana transportation environment. While State representatives from the four neighboring States declined to actively participate in advisory committee meetings, several expressed the interest of being informed of IMS progress. These received meeting notes and presentation copies periodically. Input from other IMS state programs was provided by the Booz·Allen-led IMS team.

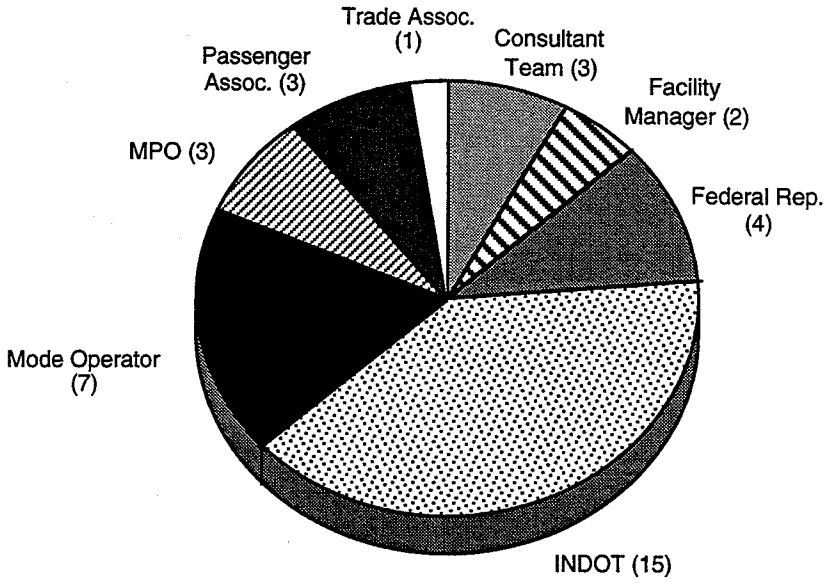
The IMS team first contacted potential advisory members through formal INDOT correspondence. Little by little, a full committee was formed by the time of the first IMS Advisory Committee meeting on May 22, 1996. During this kick-off session, advisory members were asked to select one of two subcommittees: freight or passenger. This enabled IMS team members to conduct more focused presentations, while targeting issues of greater interest to individual advisory members. A number of advisory members (such as airports and MPOs) expressed the interest to be present during both passenger and freight sessions, so subsequent meetings were scheduled so as to make that possible.

The full Advisory Committee listing is presented in Appendix B. Summary subcommittee composition charts are presented below:

FREIGHT SUBCOMMITTEE
45 Members



PASSENGER SUBCOMMITTEE
38 Members



The subcommittee composition diversity is testimony to INDOT's persistence in reaching to a diverse transportation stakeholder constituency. As the advisory committee meetings later demonstrated, bringing such wide range groups together into one room proved extremely beneficial.

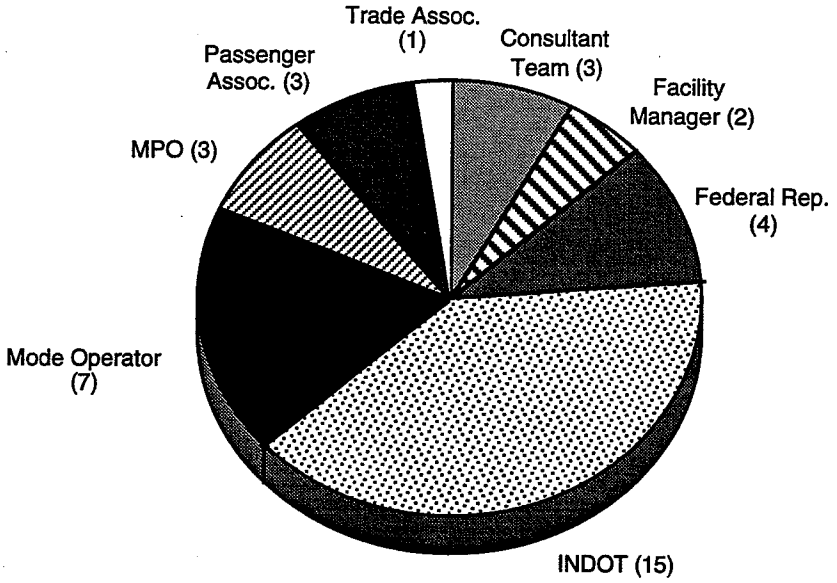
1.3.2 GIS Development

Like many of the other ISTEA advocated management systems, the IMS will grow over time. For this reason it needs to remain flexible and have the capability to incorporate future needs. The IMS team spent significant time during the project's early phases discussing the future dynamics and roles of the management systems, and particularly those of the IMS. Booz·Allen later issued a working paper on management system integration from a systems perspective[1]. This report is presented at the end of this document in Appendix C.

One of the key technological breakthroughs occurring with the emergence of management systems has been the growing array of Geographic Information Systems (GIS). These software systems are becoming more user friendly and exhibit increasingly improved information storage and display capabilities.

1 *Management Systems Integration, Booz·Allen & Hamilton Inc., October 1996.*

PASSENGER SUBCOMMITTEE
38 Members



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In total, four subcommittee meetings were held. Dates and topics covered are listed below:

Meeting	Date	Topics Covered
1	5/22/96	Kick-off and introductions; ISTEA and management system background; IMS description; information needs
2	8/7/96	Deficiency survey responses; deficiency round table discussion; alternative performance measures; criteria for facilities of statewide significance
3	9/26/97	Finalization of network of statewide significance; deficiency supporting data and additional deficiencies; performance measures selection
4	1/29/97	IMS development process; presentation of network of statewide significance; results of statewide deficiency analysis; approach to developing actions and strategies; next steps in the IMS and for the Advisory Committee.

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The Division of Planning at INDOT's development of a GIS as a Decision Support System is examined in chapter 3, "IMS Development and User Interface". The IMS data was compiled and stored in databases that can now be directly viewed using the PC-based GIS.

1.3.3 Network of Statewide Significance

The identified transportation network, or blueprint for associating improvements to physical links and facilities, represents the network of statewide significance for the IMS. Development of the network began with the National Highway System (NHS), the identification of major intermodal facilities using federal criteria, to which were added NHS Major Intermodal Connectors, and finally, "significant" statewide facilities and their links to the NHS. The network also includes rail layers developed by INDOT.

1.3.4 Deficiency Identification

Deficiencies directly address the basic question, "what are the most severe intermodal transportation problems in the State of Indiana?" The IMS deficiency identification was based on a three step process. First, the IMS team administered a survey through the advisory committee to identify a representative sample of deficiencies. Results from the survey helped develop intermodal, market-based performance measures. Finally, the IMS team applied its adopted performance measurement framework and its associated algorithms to the network of statewide significance to identify final deficiencies.

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1 *Management Systems Integration, Booz·Allen & Hamilton Inc., October 1996.*

1.3.5 Performance Measures

Using the results compiled from previous tasks, the IMS team worked towards developing a framework of performance measures specific for the project's needs. Critical to this approach was the understanding of the outputs of other management systems currently used in Indiana and in other States.

The aforementioned survey instrument indicated preliminary "target" areas for which performance measures needed to be developed. Secondly, the IMS team presented several rounds of draft performance measures to the committee to elicit comments and feedback. Finally, all feedback was incorporated and a final set of performance measures were completed.

1.3.5 Data Collection Tasks

The IMS required the identification and compilation of data on intermodal connections, facility demand at stations, general facility features, and on freight and goods movement market. Most were not historically compiled by State or even regional transportation entities.

The IMS team separated the data search effort into access link spatial and attribute data, on the one hand, and facility data, on the other. Demand and speed data were, for the most part, collected though the local MPO. The IMS team was also able to make use of information contained in other management systems, such as Congestion (CMS) and Safety (SMS). INDOT's Road Inventory file proved useful as secondary source for State/US roadway demand statistics as well as for free flow speeds.

The remainder of all data collection was collected over the telephone, over a five month period. The extensive contact list developed as part of that effort is presented in Appendix D. Generally the IMS team found the persons contacted interested in the project, and happy to supply the information.

1.3.7 Deficiency Analysis and Ranking

Deficiencies were ranked based on severity by applying the performance measure algorithms. The objective of the ranking process is to allow the state planning process to focus on a handful of deficiencies for further, more detailed analysis as appropriate.

For each performance measure category, a deficiency ranking table and/or chart was developed and presented to the Advisory Committee.

1.3.8 Actions and Strategies Development

Actions and strategies are the last step in the IMS process. Actions and strategies are then recommended to mitigate the most severe deficiencies identified. The development of actions and strategies relied on all other tasks and represents one of the major outputs of this study.

Note that the actions and strategies recommendations are not meant to be project specific. Rather, they are intended to provide focus and guidelines to any subsequent efforts. Actions relate more to specific deficiencies such as safety or mobility. Strategies refer to "big picture" policy issues that can help address the intermodal deficiencies on a macro scale.

Concurrently to the development of the IMS study, Dr. William Black from Indiana University at Bloomington completed the second phase study of freight transportation flows in Indiana, using the 1993 Commodity Flow Survey as a basis for the commodity assignment modeling. This report includes a summary of this study, relevant assignment information, as well as a general discussion on intermodal traffic trends. This information is presented in Chapter 6, Traffic Flows and Assignments.

The remainder of this report discusses each component of the IMS in more detail.